

SPECIFICATIONS

Connectors

Bantam jacks, Line 1 and 2 Tx/Rx
 Serial Port: 8 DIN, RS232C (V.24), DTE
 Datacom Port: SCSI-36 system expansion port

Test Mode

T1SINGLE: T1 line testing
 T1DUAL: Bidirectional T1 line testing, DS0/VF
 channelized drop/insert, SS7 protocol analysis, ISDN
 PRI protocol analysis and call setup, DDS testing
 T1-MUX: Fractional T1 datacom port drop/insert testing
 DATACOM: V.35, RS449/V.36, X.21/V.11, RS232/V.24

Status/Alarm Indicators

Power and low battery LED indicators
 16 dual-color LED indicators for Line 1 & 2: Pulses, B8ZS,
 AIS, Yellow Alarm, SF-D4, ESF, SLC-96, Error
 Logical: Test Pattern Sync, bit error

T1 Interface

Framing: SF-D4, ESF, SLC-96
 Coding: AMI, B8ZS
 Access Mode
 DSX Monitor: 100Ω , $\pm 1\%$
 Bridge: $> 1000\Omega$
 Terminated: 100Ω , $\pm 1\%$
 Transmitter
 Line Build Out (LBO): 0, -7.5, -15, -22.5 dB
 Clock: Internal (1.544 MHz, ± 5 ppm), looped, external
 Pulse shape to TR-TSY-000499; reference: G.703,
 CB113, CB119, CB132, CB143, PUB62508, PUB62411
 Receiver
 Terminate, Bridge: +6 to -36 dB cable loss
 DSXMON: -15 to -25 dB, resistive
 Frequency range: 1542 kHz to 1546 kHz

Test Patterns

Repeating: 3 in 24, 1 in 8 (1:7), 1 in 16, 55 octet, 55
 Daly, Alt 1010, All 0s, All 1s, FOX, T1-T6, DDS1, DDS2,
 DDS3, DDS4, DDS6
 Pseudo random: QRS, PRBS $2^n - 1$, $n = 6, 7, 9, 11, 15, 20, 23$
 Programmable: 10 patterns, 2048 bits long with user
 defined alphanumeric labels
 Test pattern inversion

Error Injection

BPV, logic, frame errors; programmable error burst 1 to
 9999, or error rate 2×10^{-3} to 1×10^{-9}

Measurements

Error Types: BPV, Bit error, Framing bit error, CRC-6 error
 Error Reports: Total count, error rate, ES, %ES, SES,
 %SES, UAS, %UAS, AS, %AS, DGRM, %DGRM
 Alarm Statistics: AIS seconds, loss of signal seconds,
 Yellow Alarm seconds, loss of frame seconds, change
 of frame alignment seconds
 G.821 Analysis

Signal Measurements

Signal available seconds count and percent, loss of
 signal seconds count & percent, low density seconds
 count, excess 0s seconds count, AIS seconds count
 Receive bit rate: 1542 to 1546 kbps, ± 1 bps, ext/int
 clock
 Receive level (volts and dBdsx): Vpeak-peak, V+peak,
 V-peak

Simplex current: 1 to 200 mA, ± 1 mA, $\pm 5\%$

Frequency Measurements

Moving bar graph of slip count, max frequency, min
 frequency, clock slips, frame slips, max positive
 wander, max negative wander

General

Measurement Duration: Continuous or timed
 (programmable from 1 min to 999 hours)
 Printing at timed interval or at end of test
 Printing on alarm or event with timestamp
 Error/Alarm events and test results may be stored in
 NVRam in absence of printer

Other Measurements

View Received Data

View T1 data in binary, hex, ASCII
 Shows data in bytes by timeslot
 Trap 60 pages of data, 8 bytes per page
 Captures 256 consecutive timeslots and stores as user
 pattern

Bridge Tap

Automated transmission & measurement of 21 different
 patterns to identify possible bridge taps on line



SunSet™ T10

Propagation Delay

Measure roundtrip propagation delay in unit intervals ± 1 UI, with translation to microseconds and one way distance over cable

Quick Tests

Two programmable automated loopback tests that save time when performing standardized loopback tests

CSU & NI Loopback Control

In-band Codes

CSU, NI, 100000

10 programmable user patterns

ESF-FDL

Payload, Line, Network

10 programmable user patterns

HDSL Span Control

Looping and control of HDSL equipment from DS1 access

Supports loopback commands for HTU-C, HTU-R, HRU, HLU, HRE

Graphical display updates with span status

Includes SF/ESF modes, arm, disarm, loop up, loop down, timeout disable

Westell & Teltrend Looping Device Control (SW184)

Automated looping of Westell and Teltrend line and central office repeaters. Includes SF and ESF modes, arm, loop up/down, loopback query, sequential loopback, power loop query, span power down/up, unblocking

ESF Facility Data Link (SW182)

Read and Send T1.403 message on FDL (PRM and BOM)

Automatic HDLC protocol handling

YEL ALM, LLB ACT, LLB DEA, PLB ACT, PLB DEA

T1.403 24 hour PRM collection per 15 min interval

SLC-96 Data Link (SW182)

Send and receive message

WP1, WP1B, NOTE formats

Alarms, switch-to-protect, far end loop

To Telcordia TR-TSY-000008 specifications, mode I and III

Westell & Teltrend PM NIU and MSS (SW184)

Supports Westell and Teltrend performance monitoring network interface unit and maintenance switch system with ramp. Set/query NIU time and date. Query performance data by hour or all. Reset performance registers. Read data over RAMP line. Perform maintenance switch.

Pulse Mask Analysis (SW190)

Scan Period: 800 ns

Measurements: Pass/Fail, rise time, fall time, pulse width, %overshoot, %undershoot

Resolution: 1 ns or 1%, as applicable

Masks: ANSI T1.102, T1.403; AT&T CB119, Pub 62411

Pulse/Mask Display: Test set screen and SS118 printer

DDS Basic Package (SW188)

Test from T1 interfaces

Choose receive and transmit timeslots independently

Test rates: 2.4, 4.8, 9.6, 19.2, 56, 64 kbps

Patterns: 2047, 511, 127, 63, All 1s, All 0s, DDS-1, DDS-2, DDS-3, DDS-4, DDS-6, 8-bit user, Alt 1010

Loopbacks: Latching, interleaved. CSU, DSU, OCU, DSO-DP, 8-bit user

Measurements: Bit errors, Bit error rate

Control code send/receive: Abnormal, mux out-of-sync, idle

Teleos & Switched 56 Tests (SW187)

Switched 56 call setup and bit error rate testing

Teleos signaling sequence timing analysis and dial digits decoding

Fractional T1

Error measurements, channel configuration verification

Nx64 kbps, Nx56 kbps, N=1 to 24

Sequential, alternating, or random channels

Auto scan and auto configure to any FT1 order

CSU & NI Emulation (SW181)

Bidirectional

Responds to loopback commands, in-band and out-of-band (ESF datalink T1.403)

Graphic indication of incoming signal status in both directions

Simultaneous display of T1 line measurements

Automatic generation of AIS and Yellow alarm

Loopbacks

Line 1: Line and payload loopback

Line 2: Line loopback

Simultaneous loopbacks in both directions

Local and remote loopback control

Remote Control (SW180)

VT100 emulation with same graphical interface used by test set

Circuit status table provides current and historical information on test set LEDs

Uses 8 pin MINI DIN, RS232C, 9600 baud preferred

Voice Frequency Capabilities

Monitor speaker with volume control for Line 1 and 2

Built-in microphone for talk

View all 24 channel A, B (C, D) bits for Line 1 and 2

Control A, B (C, D) bits (E&M ground/loop start, FXO, FXS, on/off hook, wink)

Companding law - μ Law

Programmable idle channel A, B (C, D) bits

Selectable idle channel code, 7F or FF hex

VF Level and Frequency Measurement

Level: +3 to -60 dBm, resolution 0.1 dBm

Frequency: 50 to 3950 Hz, resolution 1 Hz

VF tone generation

Variable tone: 50 to 3950 Hz @ 1 Hz step, +3 to -60 dBm @ 1 dBm

Fixed tones: 404, 1004, 1804, 2713, 2804 Hz @ 0 dBm and -13 dBm

Noise Analysis (SW183)

Signal to noise (S/N)

Noise with filters: 3 kHz flat, C-message, C-notch

MF/DTMF/DP Dialing, Decoding/Analysis (SW185)

MF/DTMF/DP dialing up to 32 digits, 10 user programmable quick dial number for each tone type

MFR1 digits, 0 - 9, KP, ST, ST1-3, Pause

DTMF digits, 0 - 9, *, #, A, B, C, D, Pause

DP digits, 0 - 9, Pause

MF/DTMF decode up to 40 received digits. Analyze number, high/low frequencies, high/low levels, twist, tone period, interdigital time.

Analyzer dynamic range: 0 to -25 dBm

DP decode up to 40 digits. Analyze number, %break, PPS, interdigital time

Programmable interdigital period, tone period, and tone level (MF, DTMF)

Programmable %break and interdigital period @ 10 pps (DP)

Signaling Analysis

Analyze mode

Tracer on A, B (C, D) signaling state changes for Line 1 and 2 with timestamps

MFR1: Timing analysis of signaling transition states and dialing digits decoding of MFR1 signaling

MFR1M: Modified MFR1 CO switches signaling analysis

MIXTONE: Decode a signaling sequence that has both MF and DTMF digits

Protocol Analysis

SS7 (SW189A)

Layer 2, 3, 4 analysis to bit level

SU traffic analysis

Counters for FISU, LSSU, TUP, ISUP, SNM, SNT messages

Counters for FIB and BIB retransmissions

% analysis on different types of messages

MSU tracer

User programmable trace filter; CIC, DPC, OPC, H1H0, Signaling address

View bidirectional real time message flow

Messages are interpreted up to layer 4 or displayed in hex format.

The trace storage holds up to 1000 messages.

SS7 TCAP Analysis (SW189B)

ANSI T1.114

TCAP filter: And/or filtering on Origination and Destination Transaction ID

Decoding: For Transaction, Dialogue, and Component Portions

Transaction Portion decoding includes Package Type and Transaction ID

Dialogue Portion decoding for Information Element Identifier and Context

Component decode screen displays Component Type, Correlation ID, Operation Code (Operation Family & Operation Specifier), and Parameter Identifier and Contents

ISDN PRI (SW186)

Bidirectional monitoring and call analysis

National ISDN-2, AT&T 5ESS, ETSI, and Northern Telecom DMS-100 compatible

NT and TE emulation

Voice and data call setup and receive

Built-in microphone and speaker for B-channel talk/listen

Supports multirate Nx64k data calls

Generates 2047, 511, 127, 63, All 1s, All 0s, and user programmable 8-bit test patterns

Bit error rate test with G.821 analysis

Supports 23B+D, 47B+D, and 46B+2D

Test for Backup D-channel in 46B+2D

User programmable trace filter, view bidirectional real time message flow. Messages are interpreted up to layer 3 or displayed in hex format.

Trace storage holds up to 1000 messages with timestamps

On-screen help for special optional call feature programming

GSM 16K Voice/TRAU Analysis (SW191)

Supports GSM 06.10, 08.60

Drop/Monitor 16 kbps GSM channel at 13 kbps voice rate to built-in speaker

Selectable timeslot (1 to 24) and subchannel (1 to 4)

Codification RPE LTP at 13 kbps

Frame type decode of 16 kbps subchannel (Voice, Data, Idle)

Identify uplink or downlink direction

Transmit encoded 13 kbps voice message on timeslot/subchannel

BERT (G.821) on 16 kbps subchannel: Bit error/rate, ES, SES, EFS, UAS, LOSS

Send test pattern on 16 kbps: 2047, All 1s, All 0s, Alt 1010

GR-303 Analysis (SW193)

Bidirectional monitoring of TMC/CSC/EOC channels

Tricordia GR-303-CORE

TMC/CSC Monitoring

Decode to Layer 3

Statistics counters for each cause value

1000 messages can be stored with date & timestamp, direction, and full L3 decode

Trace filters for: Call Reference Value, DS0, DS1, Cause Value

EOC Verification

Decode to Layer 2

Errored or discarded frame counters

Filter on SAPI/TEI combination

Frame Relay Analysis (SW194)

Supported from DS1 or V.35 interface

Test Rate: 1.544 Mbps, Nx56 kbps, Nx64 kbps

Supports ITU-T Q.933, ANSI T1.617

Mode: UNI DTE/DCE

Requires factory installation

LMI Analysis

Auto configuration for protocol type

Settings: T391 Status Enquiry, T393 Status, N391 Full Status

Polling, N392 Error Threshold, N393 Monitor Events

Results: Link O.K. Total, Link Errored Total, Timeout Error, Response Sequence Number, Wrong message

PVC Status: New, Active, New & Active, or Inactive DLCI indication

PING Testing

Transmit and respond to PING messages

Send Settings: DLCI length (2-4 bytes), DLCI value, Local IP, Destination IP, Network Layer Protocol Identifier (NLPID), Timeout, Number of PINGS

Results: Number of PINGS, Number sent, PING status (received, unreached, errored), Round Trip Time (current, average, maximum, minimum)

Response settings: Local IP

Response results: PVC status, Number of PINGS, Number received, PING from IP address with timestamp

Datacom Interface (SS151)

Supports V.35, X.21 (V.11), RS232 (V.24), RS449 (V.36)

RS530 interfaces

DTE, DCE Emulation

SCSI-36 connector to test set: Adapter cables for V.35, X.21, RS232 (V.24), RS449 (V.36), RS530

Synchronous data rates: 300 bps to 1.544 Mbps

Asynchronous data rates: 50 bps to 19.2 kbps (RS232-V.24 only)

Send test patterns and make G.821 measurements

Bit error injection

View transmit and receive signal status: TxD, TxC, RxD, RxC, DTR, RTS, CTS, DSR, RL, LL, RI

Control signal leads: DTR, RTS, CTS, DSR, DCD, RL, LL, RI

Invoke Local Loopback (LL), Remote Loopback (RL)

Internal or received clock selectable

Hitless 1.544k, Nx56k and Nx64k T1 drop and insert, via V.35, X.21 (V.11), RS232 (V.24), RS449 (V.36) interface; DCE mode only

GENERAL

Operating temperature: 0°C to 50°C

Operating humidity: 5% to 90%, noncondensing

Storage temperature: -20°C to 70°C

Size: 2.4" (max.) x 4.2" (max.) x 10.5"

Weight: 2.5 lb [1.1 kg]

Battery operation time: 2 1/2 hr nominal

AC operation: 110V/120V @ 60 Hz, or 220V/240V @ 50 Hz

3 year warranty on chassis

1 year warranty on accessories and battery

ORDERING INFORMATION

Test Set

SS150B SunSet T10 Chassis
Includes chassis, Software cartridge, NiMH battery, Universal Charger (SS138C), Instrument Stand, and User's Manual

Hardware Option

SS151 Datacom Module
Includes cable adapters for V.35, RS449/V.36, X.21, RS232, DTE and DCE

Software Options

SW180	Remote control
SW181	CSU/NIU Emulation
SW182	ESF & SLC-96 Data Link Send and Receive
SW183	VF Level, Frequency, and Noise Measurement
SW184	Westell, Teltrend Intelligent Products
SW185	MF/DTMF/DP Dialing, Decoding, and Analysis
SW186	ISDN PRA (also known as PRI) Call Setup & D-channel Monitor
SW187	Switched Call Setup and BERT
SW188	DDS testing (T1 interface access)
SW189A	SS7 Protocol Analysis
SW189B	SS7 TCAP Analysis
SW190	Pulse Mask Analysis
SW191	GSM 16K Voice/TRAU Analysis
SW193	GR-303 Analysis
SW194	Frame Relay Analysis (Requires factory installation)

Accessories

SS101	Carrying case
SS104	Cigarette lighter battery charger
SS105	Repeater extender
SS106	Single bantam to bantam cable, 6'
SS107	Dual bantam to bantam cable, 6'
SS108	Single bantam to 310 cable, 6'
SS109	Single bantam to alligator clip cable, 6'
SS110	Dual bantam to 15-pin D-sub connector cable, Male, 6'
SS111	Dual bantam to 15-pin D-sub connector cable, Female, 6'
SS112	2 single bantams to RJ-48 8 position modular plug cable, 6'
SS115B	8-pin mini DIN to DB9 Printer cable
SS116	Instrument stand
SS117	Printer paper, 5 rolls, for SS118
SS118B	High capacity thermal printer. Includes SS115B.
SS122C	Null Modem Adapter
SS123A	SunSet jacket
SS127	Printer 220VAC charger for SS118
SS128A	120V/12V 1.2A SunSet Charger
SS130A	19"/23" SunSet Rack Mount - Removable
SS130B	19"/23" SunSet Rack Mount - Permanent
SS132	Two single bantams to 4-position modular plug cable
SS136	SunSet T10 User's Manual
SS138C	SunSet AC Adapter, 100-240 VAC, 50/60 Hz input, output 15 VDC @ 2A
SS152	SunSet T10 Training Tape
SS252	V.35 DTE/DCE Adapters
SS253	X.21/V.11 DTE/DCE Adapters
SS254	RS232/V.24 DTE/DCE Adapters
SS255	RS449/V.36 DTE/DCE Adapters
SS262	RS530 DTE/DCE Adapters
SS308	Datacom Cable SCSI-36 (m) to DB-37 (f), 6'



Note: Specifications subject to change without notice.
© 2001 Sunrise Telecom Incorporated. All rights reserved.
Printed in USA.

22 Great Oaks Blvd.
San Jose, CA 95119
ph 1 408 363 8000
fax 1 408 363 8313
info@sunrisetelecom.com

www.sunrisetelecom.com